

## **Chem 120 - Syllabus**

**Course Description:** Introductory study of general inorganic, organic, and biochemistry including but not limited to: the laws and history of chemistry, the composition, properties, reactions, structures, and physical and chemical changes of matter.

**Prerequisites:** A grade of “C” or better in Math 113 or a math score of 22 on the enhanced ACT or by permission of the department head.

### **Material Required:**

- Textbook: *Chemistry for Today*, 6<sup>th</sup> ed. Spenser L. Seager and Michael R. Slabaugh, Thomson Brooks/Cole (2006), ISBN 0-495-11282-8
- A non-graphing calculator. Graphing calculators, cell phones, pdas, or anything that has a **keyboard or memory function is not allowed during exams**. Acceptable simple calculators can be purchased from the dollar store, Wal-Mart, etc. for as little as one dollar.

**Course Objectives and Student Learning Outcomes:** After completing this course the student will be able to:

- Manipulate numerical data
- Read and analyze with comprehension
- Reason abstractly and think critically
- Apply inorganic and organic nomenclature to compounds
- Understand atomic theory and periodicity
- Understand states of matter and apply equations relating to those states
- Write and balance chemical equations and apply moles and numerical data to such equations
- Understand and explain the concepts of ionic and covalent bonding
- Produce Lewis dot structures for organic and inorganic compounds
- Understand the concept of acids and bases
- Identify organic functional groups and understand the properties of those groups
- Predict the outcome of simple organic reactions
- Understand radioactivity and types of nuclear decay
- Understand the dangers and medical uses of radioactivity and radiation
- Apply half-lives to determine the changes in the amount of radioactive materials over time
- Understand the different types and properties of biological molecules such as fats, proteins, and carbohydrates

## CHEM 120 – INTEGRATED CHEMISTRY

**Method of instruction:** Instruction will consist of classroom lectures and discussions, video animations, demonstrations, assigned readings and homework problems. Lectures will be posted to Blackboard and students are encouraged to bring the printouts to class. Students should check blackboard often for important announcements and class materials. The student is responsible for checking Blackboard frequently and complying with any announcements or instructions posted by the instructor.

**Homework:** 5 sets of homework problems will be assigned from the textbook. In order to receive credit for homework problems, all steps involved in arriving at the answer must be shown. Homework turned in after the assigned date and time will be given a grade of zero. Additionally students will be expected to read assigned portions of the textbook.

**Assessment:** Assessment of progress will be determined by four 50 minute exams, and 1 comprehensive final exam. Additionally, homework will be assigned throughout the semester to assess student's level of understanding of lecture material. The format of the exams will consist of multiple choice questions.

**Course Requirements:** Students will be required to read and comprehend material covered in class as well as any assigned readings. Additionally, students must be able to apply concepts to general problems. To get the most out of lecture, it is strongly recommended that students read the lecture material prior to coming to class.

**Evaluation:** Grades will be calculated by dividing the sum of all points earned by the student by the sum of all possible points (650)

4 - 50 minute exams -----	100 points each, 400 points
5 – homework sets -----	10 pts each, 50 points
Final Exam -----	<u>200 points</u>
	650 points possible

$$\text{Class Grade} = (\text{Sum of exams and homework})/650$$

**Grading Scale:** Letter grades will be based on the following 10-point scale.

A = > 89.50%,	582-650 points
B = 79.50-89.49%,	517-581 points
C = 69.50-79.49%,	452-516 points
D = 59.50-69.49%,	387-451 points
F = < 59.49%,	386 points or less

In the event of borderline grades upon the completion of the course, the instructor will evaluate each case on an individual basis and will consider factors such as attendance, homework, appearance at office hours and review sessions, and final exam score.

## CHEM 120 – INTEGRATED CHEMISTRY

**Attendance Policy:** Students are strongly encouraged to attend all class meetings. Attendance will be kept for every class period.

**Make-Up Policy:** Acceptable absences for exams include only illness (with a doctor's excuse), official university functions, or the death of an immediate family member (with documentation). Only these excuses, combined with prior permission will be accepted for absences from exams. Permission to take an exam outside of the scheduled time must be granted prior to the exam. **Any student that misses an exam (excused or not) without prior permission forfeits the opportunity to make-up the exam and will receive a grade of zero on that exam.** I may be contacted by email or phone at anytime, so there is no excuse for you, a family member or a friend not to contact me *prior* to missing an exam. After the graded exams have been returned to the students, no makeup exam will be given.

The students are responsible for all material covered and assigned during their absences (excused or unexcused) and the academic consequences of their absences.

### Course and University Policies:

Diversity Statement: Students should visit the MSU web page at: <http://www.mcneese.edu/policy/diversity/htm> for information about diversity awareness and sexual harassment policies and procedures.

ADA Statement: Students with impaired sensory, manual, or speaking skills are encouraged and have the responsibility to contact their instructor, in a timely fashion, regarding reasonable accommodation needs. Any student with a disability is encouraged to contact the office of Services for Students with Disabilities, (337)-475-5916. It is each student's responsibility to register with the office of Services for Students with Disabilities when requesting a reasonable accommodation. Please visit <http://www.mcneese.edu/policy/ada.php> for more information.

## **CHEM 120 – INTEGRATED CHEMISTRY**

### **Important Dates and Exam Schedule**

M - June 8<sup>th</sup> – 1<sup>st</sup> Day of Class, Review Syllabus, Begin Module 1

M - June 15<sup>th</sup> – Exam 1

M – June 22<sup>nd</sup> – Exam 2

H – July 2<sup>nd</sup> – Exam 3

F – July 3<sup>rd</sup> – 4<sup>th</sup> of July Holiday, No Class!

**T – July 7<sup>th</sup> – Last day to drop!**

F – July 10<sup>th</sup> – Exam 4

F – July 17<sup>th</sup> – Last Day of Class

**T – July 21<sup>st</sup> – Final Exam -- 3:00 pm to 5:00 pm**

### **Chem 120 Lecture Topics (subject to change)**

#### **Module 1 - Measurements and Dimensional Analysis:**

Introduce Metric, Apothecary, and Household Systems, Scientific Notation, Significant Figures, Units and Dimensional Analysis

#### **Module 2 - Chemical Bonding and Molecules:**

Atomic Number, Mass Number, Subatomic Particles, Isotopes, Periodic Table, Property Trends, Valence Electrons, Octet Rule, Ionic Bonding, Simple Ionic Compounds, Molecular Formulas, Covalent Bonding, Simple Covalent Compounds, Polyatomic Ions

#### **Module 3 - Properties of Carbon and Organic Molecules:**

Single, Double, and Triple Bonds, Cis/Trans, Organic vs. Inorganic Molecules, Lewis Structures of Inorganic and Organic Molecules, Molecular Shape and Polarity, Bond Polarity, Structural and Skeletal Formulas, Nomenclature, Organic Functional Groups and Properties (alkyl, amino, alcohol, thiol, carboxylic acid, ester, thioester, amides, ketones, aldehydes, nitrates)

#### **Module 4 - Chemical Reactions and Stoichiometry:**

Chemical Equations, Moles and Stoichiometry, Limiting Reagents and Percent Yield, Bimolecular Substitutions, Ester Hydrolysis, Oxidation of Alcohols, Peptide Bond Formation

#### **Module 5 - Solution Chemistry:**

Solutions, Solubility, Electrolytes, Molarity/Molality and Osmolarity/Osmolality, Dilution Calculations, Diffusion and Osmosis, Equilibrium, Acid/Base Definitions and Examples, pH/pOH, Weak/Strong Acids, Acid/Base Reactions, Neutralizations/Titrations, Salts and Buffers, Equivalents of Salt, Amino Acids and Zwitter Ions

#### **Module 6 - Biological Macromolecules:**

Carbohydrates/Sugar Alcohols, Krebs's Cycle and Glycolysis, Fatty Acids/Triacylglycerides, Proteins/Amino Acids, Enzymes, Stereochemistry and Chirality, Biological Implications of Chirality, +/- isomers

#### **Module 7 - Radioactivity and Radiation:**

Radioactivity, Radiation and Types of Decay, Units, Half-life, Medical Uses of Radiation (PET Scans, Cancer, Thyroid)

#### **Module 8 - Gas Laws:**

Boyle's Law, Dalton's Law of Partial Pressures